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Welfare stigma allowing for psychological and cultural effects. An Agent-Based simulation study

Dalit Contini
Università di Torino
Dipartimento di Statistica e Matematica Applicata "Diego de Castro"

Matteo Richiardi
Università di Università Politecnica delle Marche
Collegio Carlo Alberto – LABORatorio R. Revelli

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Dalit Contini
Università di Torino
Dipartimento di Statistica e Matematica Applicata "Diego de Castro"
Via Maria Vittoria 38
10123 Torino
Tel 339-011-6705779
Fax 339-011-6703139
dalit.contini@unito.it

Matteo Richiardi
Università di Università Politecnica delle Marche
Collegio Carlo Alberto – LABORatorio R. Revelli
m.g.richiardi@univpm.it

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Abstract

We investigate the effects of income support on unemployment and welfare dynamics when stigma is attached to welfare provision. Stigma has been modelled in the literature as a cost of entry into welfare. Allowing for psychological factors, we assume that with stigma welfare provision leads to lower search effectiveness; moreover, we allow for interaction among agents. Carrying out an agent-based simulation study, we find that welfare take-up rates decrease with stigma while welfare spells get longer. Unemployment rates are not monotonically related to the amount of stigma, implying that we can find higher levels of unemployment with stigma than with no stigma.

Keywords

job-search, welfare dependence, stigma, Agent-Based modeling, longitudinal data.

1. Introduction

The effect of income support policies has been the object of extensive theoretical (OECD 2005) (Rogerson *et al* 2005) and empirical research (Moffit 1992; Moffit, 2002; Blank 2002). Focus is on work disincentives. The leading paradigm is rational choice: if the benefit is high enough with respect to wages, individuals choose welfare and stay out of the labor market. The body of work from the empirical literature confirms that transfer programs considerably reduce work effort.

Aim of this paper is to investigate the effects of income support on unemployment and welfare dynamics when social stigma is attached to welfare provision. Stigma is acknowledged as one of the determinants of welfare take-up behaviour[1] (Hernanz *et al* 2004) and it has been modelled as a cost of entry into welfare (Moffit 1983). By providing a disincentive for welfare participation, stigma negatively affects take-up rates: the higher the cost of entering welfare, the lower the propensity to enter welfare.

Our model is more comprehensive. While still embedded in a utility-maximisation framework, individual behaviour is allowed to depend on psychological and cultural factors. Referring to the model for welfare dependence proposed in Contini and Negri (2006), we develop a discrete-time job search model - assuming we are dealing with "weak" individuals, with low skills and low job opportunities - with labor market features taken as given. We let stigma affect preferences by representing a cost of entry into welfare, as other authors do, but in addition we assume that with stigma welfare provision can lead to a reduction of search effectiveness, due to progressive loss of self-confidence of recipients and to unfavourable attitudes of potential

[1] The take-up rate is defined as the ratio between the number of individuals receiving the benefit and the total number of those who are eligible for it.

employers. Moreover, we allow for interaction among individuals: living in environments where most people rely on welfare can cause preferences to change by reducing the perceived cost of stigma, therefore making the benefit more desirable.

These effects are difficult to investigate empirically, as it is hard to separate the consequences of the specific policies under study from the effects of other policies at work and from macro changes occurring in the meantime. For this reason, we follow a different approach, carrying out an Agent-Based (Tesfatsion 2001) simulation study. The use of simulations is motivated by the fact that, given the complexity of the model, it would be difficult to derive analytically all the relevant results.

We explore the consequences of income support for the poor/unemployed, on welfare take-up rates, unemployment and welfare participation rates, on unemployment and welfare spell duration. Environments with and without stigma are compared. We will show that take-up rates steadily decrease with the amount of stigma, while welfare spells get longer. With respect to unemployment, we highlight two related results:

- According to traditional job-search models, stigma – by reducing the work disincentive of welfare provision and enhancing the relative value of work – should reduce unemployment. Allowing for psycho-social effects this conclusion no longer holds: unemployment rates are not monotonically related with the strength of stigma. In many situations we find (*ceteris paribus*) higher levels of unemployment with stigma than with no stigma.

- Without stigma higher benefit levels can coexist with lower unemployment and welfare participation rates. Hence, we provide some explanation[2] for the evidence that in Northern Europe, where benefits are quite generous and little stigma is attached to benefit provision because of the universalistic character of the welfare system (Saraceno 2002), unemployment and poverty rates (OECD 2005) and the length of poverty spells (European Commission 2002) are generally lower than in Southern Europe, where benefit levels are low (OECD 2004; Saraceno 2002) and being in welfare is stigmatized[3].

These results crucially rest on the assumption that employability decreases with elapsed time in welfare with stigma, and it is often reinforced by the interaction effects among individuals.

[2] Of course, many other explanations are possible. Unemployment rates are shown to be correlated with the rigidity of the employment protection legislation, with union bargaining power, with the strength of active labor market policies (Scarpetta 1996).

[3] Unemployment rates for 2003: 8.7% in Italy, 11.3% in Spain, 9.7% in France, 5.4% in Denmark, 5.8% in Sweden, 4.4% in Norway. Poverty rates for 2000: 12.9% in Italy, 11.6% in Spain, 7.0% in France, 4.3% in Denmark, 5.3% in Sweden, 6.3% in Norway (OECD 2005).

The paper is structured as follows. In section 2 we illustrate the features of the job-search model, while section 3 is dedicated to the simulation design. Results are discussed in detail in section 4. Conclusions follow.

2. The model

In typical job-search models individual behaviour is based exclusively on rational choice. Individuals are subject to random job offers, that may be accepted or rejected according to the future value of utility associated with the different options. Benefit provision to the unemployed increases the reservation wage: the larger the subsidy and the longer its expected duration, the less individuals are attracted by work, triggering the so-called "welfare trap".

In our model individuals do not operate in a completely rational manner: behaviour is allowed to depend on psychological and cultural factors. In neo-classical economics individuals' preferences are taken as given and the budget line describing available options is only subject to exogenous changes; to acknowledge for psycho-social factors, both these assumptions will be relaxed.

The main features of the model are sketched as follows:

(i) The object of individual's decision is search effort. Greater effort increases the probability to find a job, but reduces current utility by reducing time for leisure. Unemployment benefits and social assistance are treated in a unified framework[4]. Stigma may be attached to welfare provision. Following Moffit (1983), we let stigma represent a fixed cost of entering welfare[5]; as a consequence, not all the eligible will eventually claim the benefit. In this framework, at every point in time, the unemployed has to take the joint decision: 1) whether to search for work; 2) whether to enter welfare.

(ii) Behaviour may also be affected by psychological and cultural factors (Bane and Ellwood 1994). We claim that these factors should be especially relevant in those environments where stigma is strong. "… Living on public support, which in certain cultural contexts is equated with living on charity, exposes the individual to social disqualification and stigma, imprisoning him in marginal social networks and isolating him – even more than unemployment – from those social contacts which help to gain access to work opportunities. Demoralization and learned

[4] Although Contini and Negri (developing a model not formalized in mathematical terms) clearly distinguish between unemployment compensations and social assistance, we treat income support policies in a unified framework because we wish to keep the specification simple.

[5] Moffit also allows for a variable component, depending on the size if the benefit, but this component does not seem to be empirically relevant.

helplessness may also take root…" (Contini and Negri 2006), favouring reduction of the effectiveness of job-search. Moreover, prospective employers themselves might be less willing to hire welfare recipients. Thus, stigma may play a role in reducing re-employment probabilities, even when the individual rationally chooses to undertake the job-search.

(iii) Values and attitudes can be affected when individuals live in situations of socio-economic exclusion and spatial segregation; if the majority of the neighbours relies on welfare rather than work, preferences can change, making work less attractive. Our model allows for interaction among individuals; each individual occupies a cell in a bi-dimensional space, and the behaviour of those in adjacent cells contribute to shaping individual's preferences.

Let $U = f(C,L)$ be the utility function associated with consumption C and leisure L. We operate in a rigid labor market with full time jobs only. People are assumed to consume all their earnings (there are no savings, nor other sources of income), thus, consumption amounts to current income. Income is C_E if employed, C_0 if unemployed with no benefit – taken to be below the poverty threshold - and C_B with income support, where $C_0 < C_B < C_E$. A universalistic policy is considered, so that all the unemployed (who are also poor) are eligible for welfare benefits, which are in principle of unlimited duration.

Standardizing total time to 2, we fix minimum time for leisure L to 1, time for work is 1 and time devoted to job search is either s=0 or s=1. No search on the job is allowed, so that L=1 for the employed and L=2-s for the unemployed. Market wage is always higher than individuals' reservation wage: $f(C_0,2) < f(C_E,1)$. Thus, if no benefits are provided, it is better to work rather than not work.

Present utility for the unemployed is a development of the simple Cobb-Douglas function $U = C^{\alpha} L^{\beta}$. We assume that stigma is the only factor responsible for take-up behaviour[6]. With stigma, since individuals have to choose whether to search for work and whether to claim the benefit, current utility depends on C, L, and A, where A=1 if he is assisted and 0 otherwise. With no stigma, i.e with no disincentives to enter welfare, individuals will never choose A=0. On the other hand, in environments where benefit provision is disqualified, a cost ϕ of entering welfare must be applied. Moffit (1983) proposes the following model:

$$U(C,L,A) = U(C,L) - \phi A$$

[6] According to Hernanz (2004), various potential explanations of low-take-up rates for welfare benefits have been addressed in the literature: pecuniary determinants, information costs, administrative costs, social and psychological costs (stigma).

Adapting this specification to the Cobb-Douglas function and allowing for cultural effects in the model - see point (iii) above – according to which preferences change if individuals are "close" to other welfare recipients - we obtain the following function:

$$U = f(s, A, f) = \left[C_0^{\alpha} (2 - s)^{\beta}\right]^{1-A}\left[C_B^{\alpha} (2 - s)^{\beta} - \phi(1 - f)\right]^{A} \quad (1)$$

where f is the proportion of welfare recipients among the person's neighbours. When stigma is present, $\phi>0$ and individuals living close to other welfare recipients will be less affected by stigma: their preferences will change, reducing the value of work. In the extreme case where all neighbours are welfare recipients (f=1), no stigma effects are perceived by the unemployed, who are thus more prone to enter welfare and eventually stop searching for a job.

The probability of finding a job is allowed to change with elapsed time in unemployment, as skills tend to become obsolete and social contacts facilitating the match between labor supply and demand loosen (Granovetter 1995). Moreover, we assume that stigma can be the cause of further reduction in employment prospects as time spent in welfare grows longer - see point (ii). The re-employment probability is thus specified as follows:

$$p_t = \gamma_0 \left(1 - \theta^U\right)^{\tau^U} \left(1 - \theta^A\right)^{\tau^A} \quad (2)$$

where γ_0 is the corresponding probability at the beginning of the unemployment spell. Loss of skills developing with time elapsed in unemployment is related to θ^U, while reduction of work opportunities caused by welfare recipiency, occurring when stigma is present, is related to θ^A. τ^U and τ^A are respectively time elapsed in unemployment and in welfare. Notice that $\tau^A \leq \tau^U$, as people can delay welfare entry. With no search there are no chances of receiving job offers, while re-employment allows to recover the original value γ_0.

We assume that the employed are satisfied with their work activity, so that there is no search on the job, but they will loose their current job with probability δ. The unemployed, instead, choose whether to search for work or not. We assume that they evaluate present utility U_0 and the expected utility for two time units ahead; search effort and welfare participation decisions are determined by $\max_{(s_0, A_0)} V_0$, where V_0 is given by:

$$V_0 = U_0 + E[U_1]R + E[U_2]R^2$$

where $E[U_t]$ is the expected utility at time *t*, and $R \in (0,1)$ is a discount factor. Hence:

$$V_0 = U(s_0, A_0, f_0) + [U(s_1, A_1, f_1)(1 - p_0) + U_E p_0]R + [U(s_2, A_2, f_2)(1 - p_0)(1 - p_1) + U_E(p_0 + (1 - p_0)p_1]R^2$$

where s_t and A_t represent search effort and welfare participation at time *t*. U_E is the utility of being employed, while p_t is the probability to work at time $t+1$ given job-search at time *t*. Notice that p_t itself is a function of s_t. Individuals are assumed to correctly forecast their loss of employability, even when the loss is due to welfare participation[7].

There are 2^6=64 different combinations of values 0 and 1 for (s_0, A_0, s_1, A_1, s_2, A_2). V_0 is evaluated at each combination[8], and the (s_0, A_0) maximising V_0 is taken as the optimal choice for time t=0. In the following time unit, options are evaluated with respect to new current utility and the utility of the two subsequent points in time. Thus, the values of (s_1, A_1, s_2, A_2) maximizing V_0 need not to be equal to the actual choices that will be made at times t=1 and t=2[9].

Because of the progressive loss of employability with time elapsed in unemployment and welfare, job-search can be the optimal choice when employability is still high, but it becomes no longer optimal when employment prospects fall below a certain level (Richiardi and Contini 2006 demonstrate this result with regard to decisions taken with respect to an infinite time horizon). Moreover, if with no stigma everybody takes the benefit from the very beginning, when stigma is present the eligible might not ask for income support at the onset of the unemployment spell, delaying claiming when search effectiveness falls below some threshold.

3. The simulation design

The analytical model is investigated *via* a discrete-time[10] agent-based simulation (Tesfatsion 2001)[11] The simulation schedule is reported in Figure 1. At time 0 the model is initialized and the world (an IxJ torus grid) is inhabited by agents, each agent having 8 neighbours. A fraction *fractionEmployed*

[7] This is not necessarily a sensible hypothesis. The issue will be the object of future investigation.
[8] Notice that working condition at time t=2 depends on previous choices and, given that the working condition at time t=3 is not taken into consideration at time t=0, the value of s_2 maximizing V_0 is necessarily 0.
[9] This feature is addressed in the economic literature as "time inconsistency" of choices. In recent years the issue has been object of increasing interest among social scientists (see for example Fang and Silverman, 2004; O' Donoghue and Rabin, 1999).
[10] Discrete-time simulation means that the state of the system is updated (i.e. observed) only at discrete (generally constant) time intervals. No reference is made to the timing of events within a period – see, for example, (Allison 1982).
[11] The simulation is written and is build on the open source JAS simulation platform (Sonnessa 2004). The code can be downloaded from http://193.205.134.131/Entra/download/P004473/allegati_doc/Stigma.rar or requested to the authors.

of these agents start as employed, while the others are unemployed. Given that employability decreases over time in unemployment and welfare, infinitely lived agents would inevitably end up in unemployment, which is an absorbing state of the system. To prevent such a deadlock we assume that agents exit the labor market after *maxAge* periods. At the beginning of each period exiting agents are replaced by new agents. Again, with probability *fractionEmployed* each new agent start as employed, while with probability (1-*fractionEmployed*) it starts as unemployed. Seniority of the agents is randomly initialized at time 0.

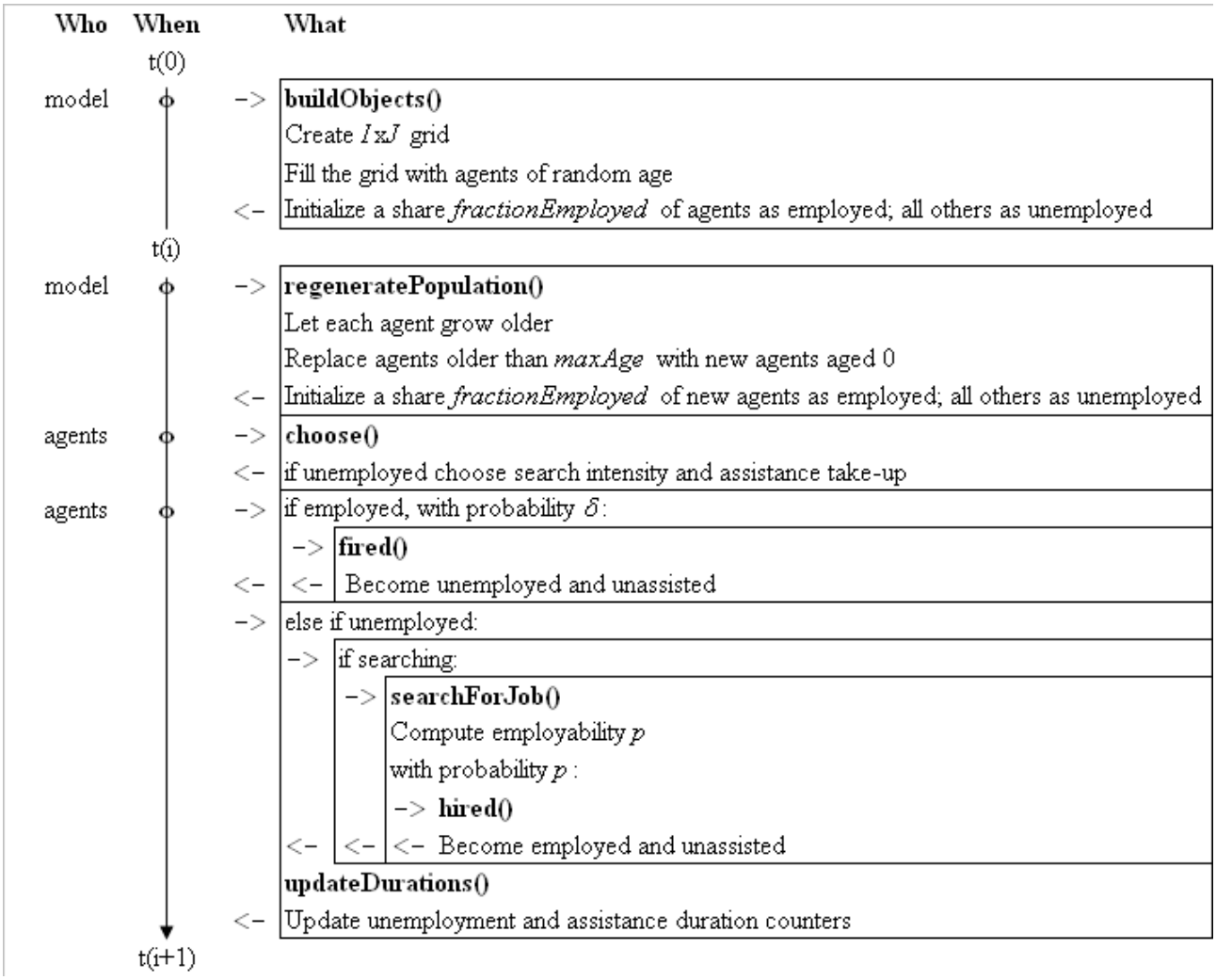

Figure 1. Simulation schedule

The scheduling of the events within each simulation period should be interpreted as suggested in Figure 2. Employed workers do nothing for the whole period. Unemployed individuals choose their search intensity and whether they are willing to enter welfare at the beginning of the period.

Search lasts for the whole period, while benefits are given, if the agent is still unemployed, at the end of the period. Transitions (from unemployment to employment and from employment to unemployment) also take place at the end of the period. As a consequence, employed workers who are fired at the end of a period start the following period with maximum employability γ_0 (their elapsed duration in unemployment and welfare is still 0 at the time when they begin searching for a new job).

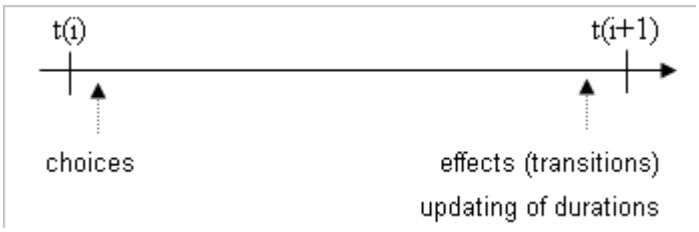

Figure 2. Continuous interpretation of the discrete time schedule

The speed of convergence to the equilibrium, defined as a regime when all relevant time series look stationary, depends on three key parameters: the equilibrium share of people in assistance, the size of the population and the number of periods individuals stay in the labor market. Given the neighbourhood effect formalised in (1), whenever one individual enters welfare it increases the likelihood that other individuals around him, if unemployed, would also choose to become assisted. Hence, the length of the chain reaction that is triggered depends on how many individuals are at risk (*i.e.* unemployed) and, for given levels of stigma, on the amount of the benefit.

With 900 simulated individuals, even in the worst case scenarios convergence is obtained within 250 periods, *i.e.* about 2 generations. All the results reported below refer to stationary values, averaged over a large number of periods.

In each period the state of the system can be summarized along two dimensions: unemployment and unemployed behaviour, which in turn depends on search intensity and welfare take-up. Figure 3 shows a typical simulation outcome: the blue cells in the grid are for employed individuals; red cells are for the unassisted unemployed and yellow cells are for the assisted unemployed. The share of active searchers would complete the description of the system. Note that assisted individuals can cluster together: this is due to the fact that the stigma associated with being in welfare is reduced if the neighbourhood contains a higher proportion of similarly assisted individuals.

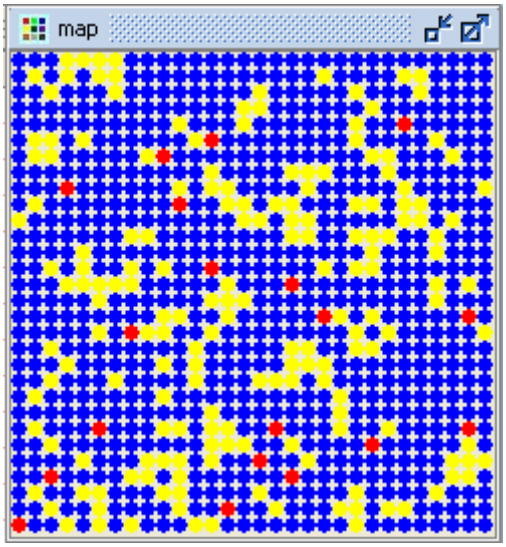

Figure 3. Simulation outcome

The simulation design has been implemented with parameter values summarised in Table 1. We consider three different environments. One with no stigma effects, the other two characterised by different levels of stigma – which is assumed to affect both the component ϕ in the utility function (1), and the component θ^A in the re-employment probability function (2). Ideally, the NO STIGMA environment should represent Northern Europe countries, while situations with stigma should somehow depict Southern Europe countries. Having no objective way to fix realistic parameters (we are not aware of studies dealing with this issue), we have chosen two alternative combinations: the one labelled as STIGMA 1 has lower values of both ϕ and θ^A than STIGMA2. Thus, the latter represents a situation with stronger stigma. Nevertheless, it is important to note that, given that these values are not empirically founded, we are not able to denote these situations as carrying out "low" or "strong" stigma in absolute terms[12].

Income with no benefit is set at C_0=1 and market wage at C_E=4. Two levels of income support are considered: C_B=1 and C_B=2.5, providing 37.5% and 62.5% of market wage respectively. Re-employment probabilities at the beginning of the unemployment spell can take two alternative values: γ_0=0.25 or γ_0=0.4, reflecting situations where individuals can have worse or better job-prospects. On the other side, the employed will loose their job with a probability δ=0.05. Core of

[12] A calibration exercise is one of our aims for future work.

the utility function is $U = C^{\alpha} L^{\beta}$, with α=2 and β=0.5[13]. We think of each time unit as one month. For this reason the discount factor is close to 1 (R=0.98). Individuals are followed for 120 time units, thus "life time" is 10 years. All individuals are unemployed at "birth", as *Fraction_Employed* (see section 3) is set to 0.

Environments	NO STIGMA: θ^A=0, ϕ=0 STIGMA 1 : θ^A =0.1, ϕ=1 STIGMA 2: θ^A =0.1.5, ϕ=1.5
Benefit levels (duration unlimited)	LOW BENEFIT: C_B=1.5 HIGH BENEFIT: C_B=2.5
Income	C_0=1, C_E=4
Job turnover	γ_0=0.25 or γ_0=0.4 θ^U=0.05 δ=0.05
Discount factor	R=0.98
Utility function	α=2 β=0.5
Life length	120 time units
Fraction employed	*Fraction Employed*=0

Table 1. Simulation parameter values

4. Results

Cross-section results are summarised in Tables 2a-2d. The following statistics have been computed with respect to the three environments considered (NO STIGMA, STIGMA1, STIGMA2): average percentage[14] across time of unemployed and welfare recipients, percentage of unemployed actively searching for a job among assisted and not assisted, welfare take-up rate, average number of assisted neighbours for the assisted. In order to highlight the role of interaction among agents, simulations where stigma is present but neighbourhood effects are not at work have been carried-out as well.

We have also performed a sensitivity analysis aimed at exploring the effects on the cross-section indicators of the variation of each parameter with a finer grid (holding the other constant). Results related to θ^A and ϕ are reported in Figures 4 and 5.

[13] These values are not empirically founded either. They have been set *ad hoc*, in order to bring about possibly "reasonable values" for present utility in the different situations under consideration. The consumption component of the function amounts to 16 for employment, 2.25 or 6.25 for unemployment with income support, 1 for unemployment with no benefit. Since search effort $s \in \{0,1\}$ and consequently leisure $L \in \{2,1\}$, given consumption, with no searching utility is $\sqrt{2}$ times utility with searching.

[14] In order to limit the complexity of the results, standard errors have not been reported; notice that their values are generally small, so that conclusions are unaffected.

Longitudinal results are described in Tables 3a-3d. We show some features of the distribution of unemployment and welfare spells[15], together with the number of spells in the observation window. In particular, given the heavy skewness of the distribution, we report the 50°, 75° and 90° percentiles (when estimable), the highest non-censored spell length and the estimated survival at that value.

The main results can be sketched as follows.

Welfare

Take-up rates are higher with no stigma while welfare spells are longer with stigma.

a) *Take-up rate*. It is always 100% with no stigma, as welfare entry has no costs. From figures 4 and 5 we can see that the percentage of the eligible entering welfare is sensitive to ϕ - and this is a well known result - but also to θ^A. When θ^A reaches a certain level, the take-up rate starts decreasing. This should be due to the fact that the unemployed correctly anticipate their future loss of employability, and thus, if this loss is strong, they might prefer not to enter welfare[16]. The joint effect of ϕ and θ^A can be observed in tables 2a-2d. For high benefit, take-up rate is always 100%, but with low benefit, rates are lower with stigma, in particular with stronger stigma. Given that neighbourhood effects have an impact on preferences, lowering the perceived cost of welfare entry, take-up rates can rise if these effects are at work (cfr. columns II and III, figure 2c).

b) *Welfare spell length.* As expected, because of the progressive loss of employability occurring when assisted, welfare spells are found to be much longer with stigma in all the situations considered, and the tendency is strengthened with increasing level of social disqualification (figures 3a-3d).

Unemployment

As we have pointed out before, job-search models including stigma predict that stigma – acting as a work incentive – reduce unemployment. According to our model, this conclusion is no longer true. In all the situations under consideration, the percentage of unemployed is higher

[15] Deduced from the Kaplan-Meier estimate of the survival function.
[16] Notice that if individuals were not able to forecast the progressive reduction of employment prospects (see also footnote 8) we should observe a different result.

with STIGMA1 than with NO STIGMA (*ceteris paribus*). Moreover, we observe a *lower* percentage of unemployed in some environments with no stigma and *high benefit* than we do in environments with stigma and *low benefit*. For example, with γ_0=0.4, with STIGMA1 and benefit set at 1.5, 26.3% of the simulated population is unemployed; the percentage falls at 14.3% with NO STIGMA and benefit set at 2.5.

c) *Unemployment spell length*. From result b) we know that, for those who enter welfare, welfare spells are longer with stigma. On the other hand, not all the unemployed are welfare recipients: a lower number of people enter welfare if there is stigma (see result a). Thus, no simple general result seems to hold. In all the simulations we have carried out, unemployment spells are longer with stigma than with no stigma, but spells do not increase (on the contrary, they can get shorter) as stigma gets stronger.

d) *Proportion of unemployed.* Everybody is unemployed "at birth", but since unemployment spell length is not monotonically related with stigma (result c), also the relation between the proportion of unemployed and stigma cannot be simply determined *a priori*. In all the simulated cases, the stock of unemployed is always higher in environment STIGMA1 than with NO STIGMA, but it can become either even higher or much lower in the environment STIGMA2. From figure 4, we see that the percentage of unemployed follows a reversed-U shape as θ^A increases. The reason for this behaviour seems to be related, once again, to the fact that the unemployed, forecasting future loss of employability if assisted, can decide not to enter welfare and keep searching for work if the anticipated loss is too big (see result a). Notice that, holding constant θ^A, the proportion of unemployed behaves as predicted in the traditional models (decreasing steadily) when ϕ varies.

Welfare (cont.)

e) *Proportion of assisted (welfare participation rate)*. As we have seen (results a and b) with stigma a lower number of eligible enters welfare, but those who do will stay longer. Moreover, since the size of the eligible population (i.e., the percentage of unemployed) does not depend monotonically on stigma, the proportion of welfare recipients over the whole population does not vary in a simple fashion. The stock of assisted is found to be much lower with no stigma than with stigma when both the level of the benefit and initial employability are relatively high (table 2d). On the other hand, with stronger stigma and low

benefit, the size of the assisted population can be very small or even null (see tables 2a and 2c, columns iv and v).

Job-search

f) With no stigma welfare recipients keep searching for a job much more often than with stigma. In all the simulated cases, the number of job-searchers among the assisted decreases with the strength of stigma (although figure 4 shows that it is not a monotonic pattern). The job-search behaviour of the unassisted population is not very clear, as that population can be very small in many cases.

Assisted neighbours

g) The average number of assisted neighbours for those who are assisted themselves provides a rough indication of whether the assisted individuals tend to cluster together. Clustering should occur with stigma, when neighbourhood effects are at work. Yet, this number by itself is not very informative: it should be compared with the average number of assisted neighbours corresponding to a completely random allocation of welfare recipients in the bi-dimensional space. If the proportion of assisted is *p*, with a constant number of neighbours *n*, the relevant distribution is that a binomial, thus the average is simply *np*. Given the shape of the grid, where some individuals have 8 neighbours, those on the edge have 5, and those on the angles of the square have 3, the average value is: $8p\frac{784}{900} + 5p\frac{112}{900} + 3p\frac{4}{900}$. Both the observed average number and the expected value under the assumption of randomness are reported. There is no strong evidence of clustering effects, perhaps with the exception of environment STIGMA2, case of low benefit and low employability, neighbourhood effects at work (column v, Table 2a).

Table 2. Cross section statistics.

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
% unempl.	25.6	56.6	57.0	22.5	23.2
% assisted	21.9	54.4	54.9	0.9	1.4
take-up rate	100.0	100.0	100.0	5.1	7.2
%search | assist	100.0	24.3	24.1	0.0	0.23
%search | not ass	–	–	–	100.0	100.0
Mean n° assisted neighbours Observed/Random	1.91/1.75	4.44/4.35	4.46/4.35	0.095/0.072	0.17/0.11

2a. Benefit low (C_B=1.5) and low employability (γ_0=0.25)

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
% unempl.	59.8	83.3	88.8	83.8	89.2
% assisted	57.8	82.5	88.2	83.0	88.7
take-up rate	100.0	100.0	100.0	100.0	100.0
%search | assist	12.8	3.6	2.2	3.6	2.1
%search | not ass	–	–	–	–	–
Mean n° assisted neighbours Observed/Random	4.65/4..39	6.60/6.27	7.05/6.70	6.64/6.31	7.09/6.74

2b. Benefit high (C_B=2.5) and low employability (γ_0=0.25)

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
% unempl.	13.3	14.6	26.3	13.2	13.2
% assisted	9.0	2.2	21.5	0.00	0.00
take-up rate	100.0	21.5	95.2	0.00	0.00
%search | assist	99.0	32.4	43.4	–	–
%search | not ass	–	100.0	100.0	100.0	100.0
Mean n° assisted neighbours Observed/Random	0.92/0.69	0.16/0.17	2.14/1.63	0/0	0/0

2c. Benefit low (C_B=1.5) and high employability (γ_0=0.4)

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
% unempl.	14.3	44.0	44.7	54.7	60.2
% assisted	10.1	41.3	41.9	52.4	58.2
take-up rate	100.0	100.0	100.0	100.0	100.0
%search | assist	84.9	15.5	14.9	10.1	7.6
%search | not ass	–	–	–	–	–
Mean n° assisted neighbours Observed/Random	1.0/0.8	3.4/3.1	3.5/3.2	4.3/4.0	4.7/4.4

2d. Benefit high (C_B=2.5) and high employability (γ_0=0.4)

Table 3. Longitudinal statistics

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
UNEMPLOYMENT SPELLS					
N° spells	21102	14262	14214	21502	21759
50°, 75°, 90° p.	3, 6, 11	3, 10, (n.e)[1]	3, 10, (n.e)[1]	3, 6, 11	3, 6, 11
All cens. from time	22	13	13	45	45
% all cens	2.6	21.0	21.7	0.9	0.7
WELFARE SPELLS					
N° spells	15325	10530	10448	135	98
50°, 75°, 90° p.	3, 7, 12	4, (n.e), (n.e)	4, (n.e), (n.e)	(n.e.), (n.e), (n.e)	(n.e.), (n.e), (n.e)
highest non cens time (h.n.c..t.)	21	12	12	4	1
survival at h.n.c..t.	3.6	29.2	29.6	97.8	100

3a. Benefit low (C_B=1.5) and low employability (γ_0=0.25)

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
UNEMPLOYMENT SPELLS					
N° spells	8557	4505	4670	5988	3937
50°, 75°, 90° p.	3, (n.e.), (n..e.)	(n.e.),(n.e.),(n.e.)	(n.e.),(n.e.),(n.e.)	(n.e.),(n.e.),(n.e.)	(n.e.),(n.e.),(n.e.)
highest non cens time (h.n.c..t.)	6	3	2	3	2
survival at h.n.c..t.	26.0	55.0	64.8	54.8	66.5
WELFARE SPELLS					
N° spells	6291	3429	3640	4549	3051
50°, 75°, 90° p.	3, (n.e.), (n..e.)	(n.e.),(n.e.),(n.e.)	(n.e.),(n.e.),(n.e.)	(n.e.),(n.e.),(n.e.)	(n.e.),(n.e.),(n.e.)
highest non cens time (h.n.c..t.)	5	2	2	2	1
survival at h.n.c..t.	35.4	72.0	82.4	72.1	85.6

3b. Benefit high (C_B=2.5) and low employability (γ_0=0.25)

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
UNEMPLOYMENT SPELLS					
N° spells	23639	23373	21092	23807	25645
50°, 75°, 90° p.	2, 3, 6	2, 3, 16	2, 4, 8	2, 3, 6	2, 3, 6
highest non cens time (h.n.c..t.)	30	21	17	–	–
survival at h.n.c..t.	0.08	0.74	5.2	–	–
WELFARE SPELLS					
N° spells	13569	615	10448	1	1
50°, 75°, 90° p.	2, 4, 6	4, (n.e), (n.e)	2, 5, (n.e.)	(n.e.), (n.e), (n.e)	(n.e.), (n.e), (n.e)
highest non cens time (h.n.c..t.)	30	11	15	–	–
survival at h.n.c..t.	0.14	26.5	10.2	–	–

3c. Benefit low (C_B=1.5) and high employability (γ_0=0.4)

	(I)	(II)	(III)	(IV)	(V)
	NO STIGMA $\theta=0, \phi=0$	STIGMA 1 NO NEIGH. EFF. $\theta=0.1, \phi=1$	STIGMA 1 $\theta=0.1, \phi=1$	STIGMA 2 NO NEIGH. EFF. $\theta=0.15, \phi=1.5$	STIGMA 2 $\theta=0.15, \phi=1.5$
UNEMPLOYMENT SPELLS					
N° spells	28743	18052	16914	13060	13480
50°, 75°, 90° p.	2, 3, 6	2, 4, (n.e.)	2, 4, (n.e.)	2, 5, (n.e.)	2, 5, (n.e.)
highest non cens time (h.n.c..t.)	15	6	6	5	5
survival at h.n.c..t.	0.6	14.6	15.5	21.9	25.6
WELFARE SPELLS					
N° spells	16730	10671	9921	7734	8013
50°, 75°, 90° p.	2, 4, 6	2, 5, (n.e.)	2, (n.e.), (n.e.)	3, (n.e.), (n.e.)	3, (n.e.), (n.e.)
highest non cens time (h.n.c..t.)	14	5	5	4	4
survival at h.n.c..t.	1.1	24.7	25.5	36.9	42.9

3d. Benefit high (C_B=2.5) and high employability (γ_0=0.4)

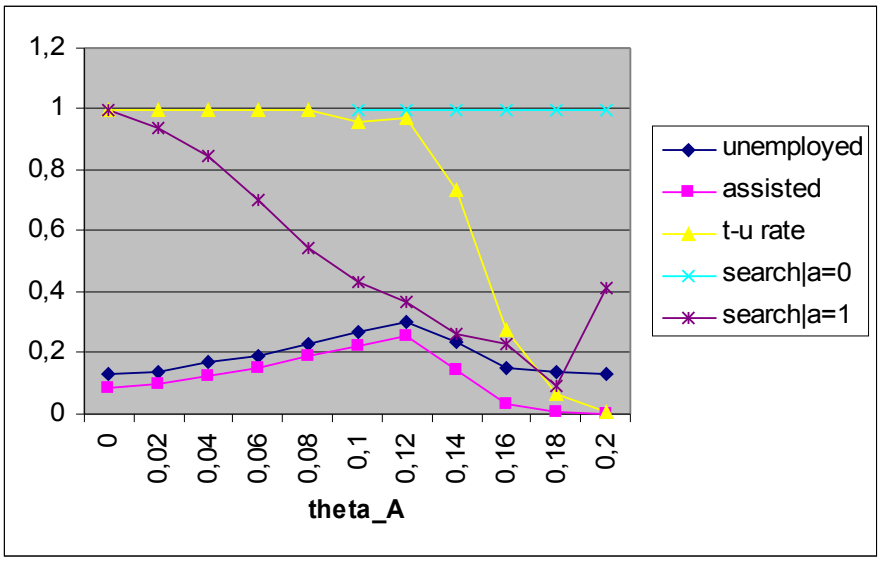

Figure 4. Simulated results for varying θ^A with ϕ=1, C_B=1.5, γ_0=0.4, with neighbourhood effects

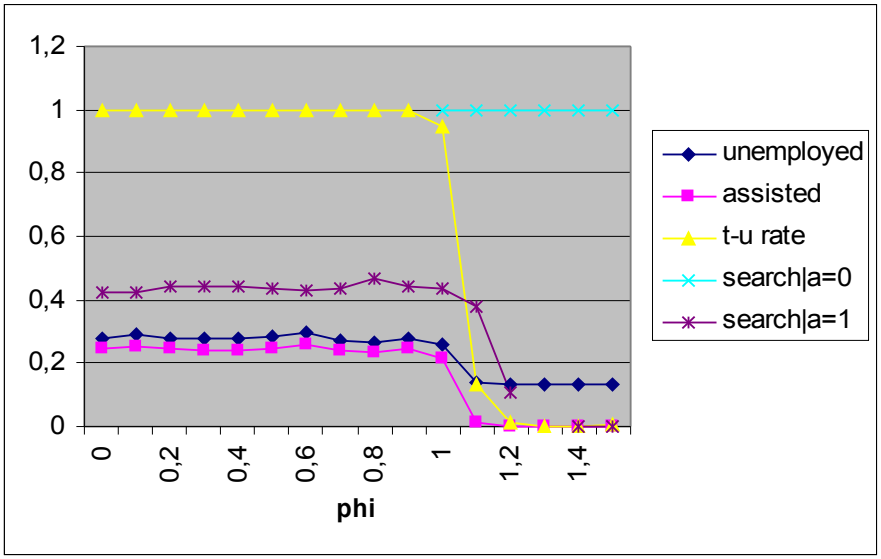

Figure 5. Simulated results for varying ϕ with θ^A=1, C_B=1.5, γ_0=0.4, with neighbourhood effects

5. Conclusions

In traditional job-search models stigma is shown to negatively affect welfare take-up rates; accordingly, unemployment levels tend to decrease with stigma. Thus, although from the point of view of attaining the goal of poverty reduction stigma is considered "a bad", because high take-up rates are among the goal of the policies (Hernanz *et al.* 2004), from the point of view of unemployment reduction stigma is considered "a good".

Under the assumption that social disqualification attached to receiving the benefit not only affects preferences - by representing a cost of welfare entry - but that it leads to a reduction of search effectiveness as well, this mainstream conclusion no longer holds. We show that the unemployment rate is related to the amount of stigma in a non-monotonic fashion: after some point it does decrease with the level of stigma, but "in the beginning" (moving away from the no stigma situation) the unemployment level is shown to increase with stigma.

This result could help explaining why unemployment rates, poverty rates and persistence of poverty are lower in Northern Europe than in Southern Europe, even if welfare and unemployment benefits are much more generous there.

The main limit is that parameter values were set arbitrarily and not derived from empirical evidence. This means that which values of (ϕ, θ^A) are adequate for each group of countries – even in a stylized fashion – cannot be assessed yet. This point will be the object of further investigation.

Policy implications are in principle very interesting, although the reduction of stigma, involving well rooted attitudes and beliefs, is not an easy goal to accomplish. Given that higher unemployment and welfare participation levels are observed when neighbourhood are allowed, the obvious conclusion is that - from many other points of view as well, indeed - spatial segregation and urban ghettoes should be heavily contrasted.

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